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The Role of Vaccination in Maternal and Perinatal Outcomes Associated With COVID-19 in Pregnancy

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Key Points

Question Is COVID-19 vaccination associated with a lower risk of adverse outcomes for cases of SARS-CoV-2 in pregnancy?

Findings This study ($n=19\,899$) demonstrated that among individuals with SARS-CoV-2 in pregnancy, COVID-19 vaccination was associated with a lower risk of maternal hospitalization (Delta: relative risk [RR], 0.38; Omicron: RR, 0.38) and critical care unit admission (Delta: RR, 0.10; Omicron: RR, 0.10), as well as preterm birth (Delta: RR, 0.80; Omicron: RR, 0.64) in both the Delta and Omicron variant time periods.

Meaning COVID-19 vaccination is associated with a lower risk of severe disease and preterm birth regardless of variant time period.

Abstract

Importance Gaps in knowledge exist about the impact of COVID-19 and vaccination on pregnancy outcomes.

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Design, Setting, and Population Population-level surveillance of pregnant individuals infected with SARS-CoV-2 and their infants using the CANCOVID-Preg database between April 5, 2021 (beginning of the Delta variant time period and initiation of recommendations for vaccination in pregnancy in Canada), and December 31, 2022. Cases were identified based on COVID-19 diagnoses in pregnancy in 9 of 13 Canadian provinces/territories. Cases occurring through 2022 were followed up into 2023 for pregnancy conclusion and infant outcomes.

Exposure SARS-CoV-2 infection in pregnancy, with or without prior vaccination.

Main Outcomes and Measures COVID-19-associated hospitalization, critical care unit admission, and preterm birth.

Results Of 26 584 cases identified, 19 899 cases were eligible for analysis. Among these, most infections occurred among those aged 30 to 35 years (46.3%) and among those of White race (55.9%). A total of 72% (n=14 367) of cases were vaccinated and 28% (n=5532) were unvaccinated prior to their COVID-19 diagnosis. Among those vaccinated prior to COVID-19 diagnosis, 80% (n=11 425) were vaccinated prior to pregnancy and 20% (n=2942) were vaccinated during pregnancy. Cases occurred during both Delta (n=6120) and Omicron (n=13 799) variant time periods. Vaccination was associated with lower risk of hospitalization (Delta: relative risk [RR], 0.38 [95% CI, 0.30-0.48]; absolute risk difference [ARD], 8.7% [95% CI, 7.3%-10.2%]; Omicron: RR, 0.38 [95% CI, 0.27-0.53]; ARD, 3.8% [95% CI, 2.4%-5.2%]), critical care unit admission (Delta: RR, 0.10 [95% CI, 0.04-0.26]; ARD, 2.4% [95% CI, 1.8%-2.9%]; Omicron: RR, 0.10 [95% CI, 0.03-0.29]; ARD, 0.85% [95% CI, 0.27%-1.44%]), and preterm birth (Delta: RR, 0.80 [95% CI, 0.66-0.98]; ARD, 1.8% [95% CI, 0.3%-3.4%]; Omicron: RR, 0.64 [95% CI, 0.52-0.77]; ARD, 4.1% [95% CI, 2.0%-6.2%]). In multivariable analyses, vaccination was still associated with lower hospitalization risk in both variant time periods after controlling for comorbid conditions. In Omicron, compared with the vaccinated group, those unvaccinated had an adjusted RR of hospitalization of 2.43 (95% CI, 1.72-3.43). In Delta, those unvaccinated had an adjusted RR of hospitalization of 3.82 (95% CI, 2.38-6.14).

Conclusions and Relevance Vaccination against SARS-CoV-2 prior to and during pregnancy, before COVID-19 diagnosis, was associated with a lower risk of severe maternal disease and preterm birth regardless of variant time period.

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